

Letters to the Editor

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Research

Nicotine Content of the Eclipse Nicotine Delivery Device

RJ Reynolds Tobacco Company has recently developed a novel nicotine de-

livery system called Eclipse in the United States. Reynolds reports that Eclipse delivers satisfying levels of nicotine but much lower levels of tar-related toxins and that it virtually eliminates the generation of environmental tobacco smoke. Such a product could conceivably be promoted as an approach to harm reduction, that is, as a way to allow someone to continue smoking with less of a health risk than from conventional cigarettes.

While Eclipse is the size and shape of a cigarette, it differs in striking ways. An insulated carbon fuel element provides the energy needed to heat an aerosol generator composed of glycerin and shredded tobacco paper surrounded by aluminum foil. When puffs are drawn through the lit device, heat vaporizes water, glycerin, nicotine, and other materials from the tobacco paper. Only a small portion of the material derived from tobacco is burned. The smoker inhales an aerosol consisting largely of water, glycerin droplets, nicotine, and the oxides of carbon. Other components of cigarette smoke, including carcinogens such as the tobacco-specific nitrosoamines, are present

as well but in amounts that are generally much lower than those from conventional cigarettes.

Various versions of Eclipse have different standardized machine-determined nicotine yields (Table 1). Our laboratory has shown that there is no relationship between such measurements and the nicotine content of tobacco in manufactured cigarettes.¹ Lower yield cigarettes are lower yield because of their engineering characteristics, such as faster burn time, more porous cigarette paper, and filter ventilation holes.² All of these features can be overcome by the way an individual smokes. The actual potential nicotine dose from a device is predicted from its nicotine content, not from its standardized machine-determined nicotine yield.^{2,3}

To assess the potential dose of nicotine from Eclipse, we measured the nicotine content of three different versions.

The total nicotine in Eclipse averaged 10.9 mg, which is similar to that in conventional cigarettes.¹ The weights of tobacco paper in the different segments, the nicotine concentration, and the total amount of nico-

TABLE 1—Nicotine Delivery (Smoking Machine-Tested) and Nicotine Content of Eclipse Cigarettes

	Machine-Determined Delivery, mg ^a		Weight of Tobacco, mg, Mean ± SD			
	Nicotine	Tar	Distal	Proximal	Total	
Eclipse Full Flavor	0.2	3	287 ± 16	406 ± 38	693 ± 26	
Eclipse Mild	0.1	2	293 ± 18	400 ± 10	693 ± 23	
Eclipse Menthol	0.2	3	290 ± 24	424 ± 35	714 ± 33	
	Nicotine Content, % Weight, Mean ± SD			Nicotine Content, mg, Mean ± SD		
	Distal	Proximal	Total	Distal	Proximal	Total
Eclipse Full Flavor	0.90 ± 0.07	1.98 ± 0.08	1.53 ± 0.09	2.6 ± 0.1	8.0 ± 0.9	10.6 ± 0.9
Eclipse Mild	0.84 ± 0.04	2.23 ± 0.06	1.64 ± 0.02	2.5 ± 0.03	8.9 ± 0.3	11.4 ± 0.4
Eclipse Menthol	0.84 ± 0.03	1.91 ± 0.05	1.47 ± 0.04	2.4 ± 0.1	8.1 ± 0.5	10.5 ± 0.5

Note. Values are averages of five cigarettes. The shredded tobacco paper appeared to be of two types, differing in color and texture. The darker paper, from the proximal end (adjacent to the filter and closest to the mouth), and the lighter paper, from the distal end (adjacent to the carbon heat source), were weighed and assayed separately for nicotine.

^aAs reported on the Eclipse packs.

tine in the shredded tobacco paper of the three types of Eclipse we tested were very similar. Eclipse contains and potentially delivers the same amount of nicotine as conventional cigarettes. The basis for the description of different styles such as "full flavor" and "mild" is not explained by nicotine content or by outward appearance.

The nicotine yields listed on the Eclipse packs invite consumers to conclude that smoking Eclipse exposes them to much less nicotine than smoking conventional cigarettes (Table 1). However, available data indicate that nicotine (and carbon monoxide) intake by people smoking Eclipse is similar to that from smoking conventional cigarettes.^{4,5} Thus, as is the case for conventional cigarettes, standardized machine-determined nicotine yields for Eclipse are poor predictors of actual nicotine exposure.¹ Any health risks related to nicotine (and/or carbon monoxide) would be expected to be similar in Eclipse and conventional cigarettes. The potential benefits of lower risks via reduced exposure to other toxins from smoking Eclipse (vs conventional cigarettes) remain to be explored. □

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Emergency Department Costs

I concur with the recent paper titled "US Emergency Department Costs: No Emergency" that it is a misconception that high emergency department use causes high medical costs.¹ As the authors explain, many of the costs of an emergency department are fixed. As a result, the true costs of accommodating nonemergency visits represent only marginal costs. My concern about inappropriate emergency department use is based primarily not on costs but on the type of care rendered.

The actual costs associated with inappropriate emergency department use are, in my opinion, much greater than the simple economic measure. As the authors note, "non-urgent [emergency department] visits symbolize our failure to provide accessible primary care to all." Their data confirmed that groups with reduced access to primary care—the poor, the uninsured, and Black men—are disproportionately dependent on emergency departments. The additional costs associated with treating an infant's ear infection in the emergency department as opposed to a family practice clinic are probably not substantial. But if that child lacks immunizations or is falling off the growth curve, the substituted emergency room visit will represent a missed opportunity for prevention. It is probable that the marginal costs for seeing a 48-year-old Black man with eczema or a 27-year-old woman with bronchitis would not be that much greater in the emergency department than in a primary care physician's office. However, if the patient uses tobacco, has early prostate cancer, or is overdue for a Pap test, it is unlikely that those issues will be addressed in the emergency department. In contrast, primary care physicians are expected to manage the individual's health by providing longitudinal care and continuity of care for both acute and chronic conditions as well as clinical preventive services. If done correctly, this can result in considerable long-term savings and improved outcomes that are not reflected in emergency department marginal cost calculations.²

Emergency departments exist to respond to life-threatening emergency and urgent conditions and represent appropriate supplemental sources of care for individuals already being cared for by primary care

providers. In large urban centers, such as Los Angeles, low-income, inner-city residents tend to use emergency departments as a substitute for the family doctors they do not have.³ Since this is their only source of care, their care is fragmented, uncoordinated, incomplete, and inappropriate. Clearly, emergency departments have a most important role in such a system, but they should not be considered substitutes for comprehensive primary care, regardless of their low marginal costs. □

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We agree with Dowling that the emergency department is not an optimal setting for primary care. But we doubt that allowing patients access to an emergency department is an important cause of inadequate primary care. Restricting patients' emergency department access, an increasingly popular measure among health maintenance organizations, neither improves primary care for those without access to other primary care sites nor saves much on patients who use the emergency department as an occasional supplement to their usual caregiver. For the uninsured, and many of the poor, the emergency department is not a substitute for comprehensive primary care but an alternative to no care at all. Even for many with coverage, barriers to emergency department care shut off an important place of refuge and assistance for the frightened or troubled.

It is poor public policy to punish or proscribe emergency department use without ensuring better and more practical alternatives. Our present system is inefficient and inhumane by many measures: a